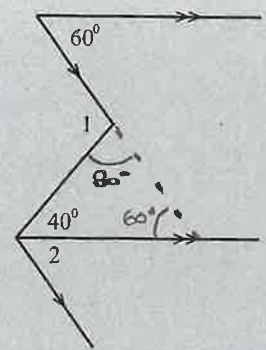
KEY

22.



$\angle 1 =$ <u>100°</u> <u>supplementary, alt interior</u>

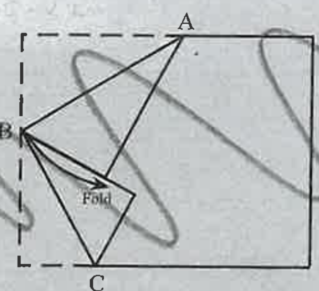
$\angle 2 =$ <u>60°</u> <u>alt interior</u>

23.

$\angle 1 =$ ______ ____________

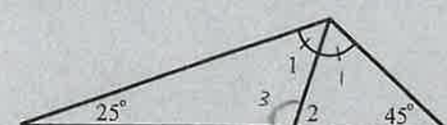
$\angle 2 =$ ______ ____________

24.



Fold a piece of paper twice such that the folds meet. What is $\angle ABC$ of the fold? Why?

25.



$\angle 1 =$ <u>55°</u> <u>Angles in a triangle; bisector</u>

$\angle 2 =$ <u>80°</u> <u>sum of a triangle</u>

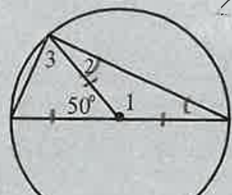
$2\angle 1 + 25 + 45 = 180 \rightarrow 2\angle 1 = 110$

$2\angle 1 = 180 - 70 \quad \angle 1 = 55°$

$55° + 45° + \angle 2 = 180$

$\angle 2 = 80$

26.

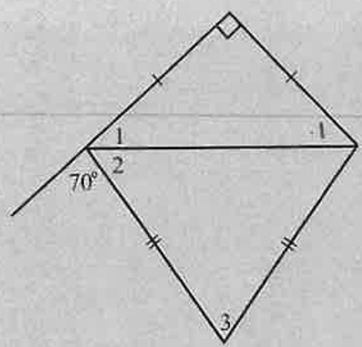


$\angle 1 =$ <u>130°</u> <u>Angles on a line</u>

$\angle 2 =$ <u>25°</u> <u>Angles in $\triangle$; isosceles</u>

$\angle 3 =$ <u>65°</u> <u>Isosceles, angles in $\triangle$</u>

27.

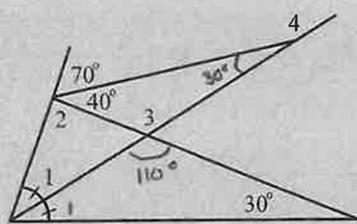


$\angle 1 =$ 45° Isosceles; Angles in △

$\angle 2 =$ 65° Angles on a line

$\angle 3 =$ 50° Isoscles; Angles in △

28.



$\angle 1 =$ 40° Angles in a △

$\angle 2 =$ 70° Angles on a line

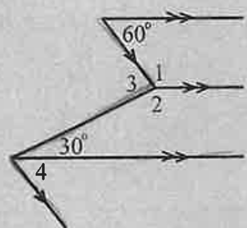
$\angle 3 =$ 110° Vertical angles

$\angle 4 =$ 150° Angles on a line

$\angle 2 + 2\angle 1 + 30 = 180$

$70 + 2\angle 1 + 30 = 180 \rightarrow 2\angle 1 = 80 \quad \angle 1 = 40$

29.



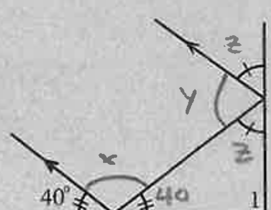
$\angle 1 =$ 120° co-interior

$\angle 2 =$ 150° co-interior

$\angle 3 =$ 90° Angles of a circle add 360°

$\angle 4 =$ 60° Alt interior + complementary

30.



$\angle 1 =$ 90° Angles in △

$2z + 80 = 180$

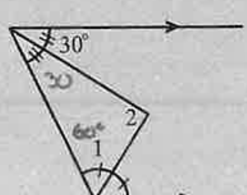
$z = 50°$

$x = 100°$

$x + y = 180°$

$y = 80°$

31.



$\angle 1 =$ 60° co-interior

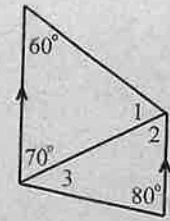
$\angle 2 =$ 90° Angles in a △

$2\angle 1 + 60 = 180$

$2\angle 1 = 120$

$\angle 1 = 60$

32.

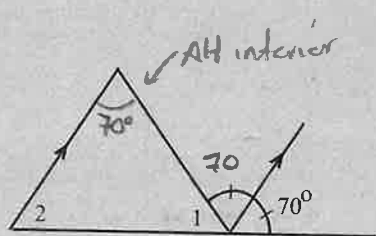


$\angle 1 =$ 50° Angles in △

$\angle 2 =$ 70° Alt interior angles

$\angle 3 =$ 30° Angles in △

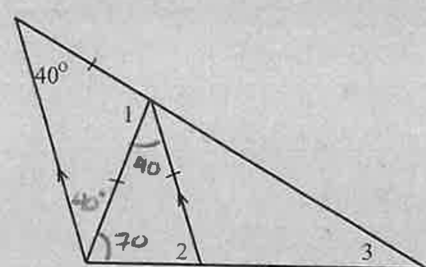
33.



$\angle 1 =$ 40° Angles on a line

$\angle 2 =$ 70° Corresponding Angles

34.

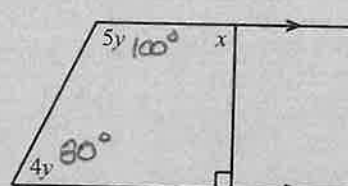


$\angle 1 =$ 100° Angles in △; Isosceles

$\angle 2 =$ 70° Isosceles; Angles in △

$\angle 3 =$ 30 Angles in △

35.

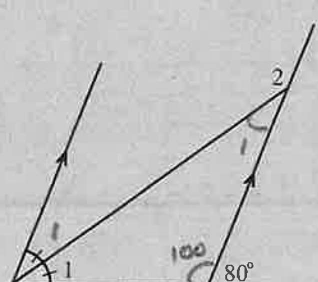


$x =$ 90 co-interior

$y =$ 20 co-interior

$5y + 4y = 180$ $9y = 180$ $y = 20$

36.



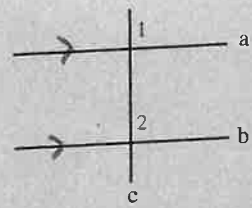
$\angle 1 =$ 40° Isosceles; Alt interior, Angles in △

$\angle 2 =$ 140° Angles on line

21. Given: $c \perp b$

$a \parallel b$

Prove: $c \perp a$



Statement	Reason
$c \perp b$	Given
$a \parallel b$	Given
$\angle 1 = \angle 2$	corresponding
$\angle 2 = 90°$	Def^n $\perp$
$\angle 1 = 90°$	substitution
$c \perp a$	Def^n $\perp$ 90° angles

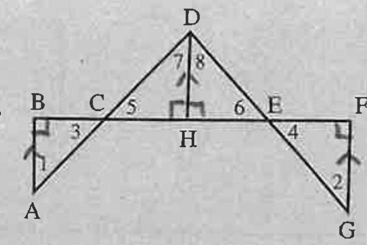
22. Given: $AB \perp BF$

$FG \perp BF$

$DH \perp BF$

$\angle 1 = \angle 2$

Prove: $\angle 7 = \angle 8$



Statement	Reason
$AB \perp BF$	Given
$FG \perp BF$	Given
$DH \perp BF$	Given
$AB \parallel DH \parallel FG$	All $\perp$
$\angle 1 = \angle 7$	Alt interior
$\angle 2 = \angle 8$	Alt interior
$\angle 1 = \angle 2$	Given
$\angle 7 = \angle 8$	Substitution

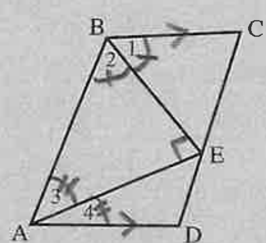
Challenge proofs

23. Given: $BC \parallel AD$

$\angle 1 = \angle 2$

$\angle 3 = \angle 4$

Prove: $BE \perp AE$



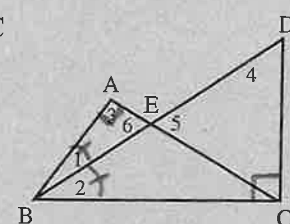
Statement	Reason
$BC \parallel AD$	Given
$\angle 1 = \angle 2$	Given
$\angle 3 = \angle 4$	Given
$\angle 1 + \angle 2 + \angle 3 + \angle 4 = 180°$	co-interior
$\angle 2 + \angle 3 = 90°$	division
$\angle BEA = 90°$	Angles in $\triangle$
$BE \perp AE$	def^n of $\perp$

24. Given: BD bisects $\angle ABC$

$AB \perp AC$

$DC \perp BC$

Prove: $\angle 4 = \angle 5$



Statement	Reason
BD bisects $\angle ABC$	Given
$AB \perp AC$	Given
$DC \perp BC$	Given
$\angle 3 = 90°$	Def^n $\perp$
$\angle 1 + \angle 6 = 90°$	Angles in $\triangle$
$\angle 2 + \angle 4 = 90°$	Angles in $\triangle$
$\angle 1 + \angle 6 = \angle 2 + \angle 4$	Both = 90°
$\angle 1 = \angle 2$	Def^n Bisects
$\angle 2 + \angle 6 = \angle 2 + \angle 4$	substitution
$\angle 6 = \angle 4$	subtraction
$\angle 5 = \angle 4$	subtraction, vertical angles

2.3 Exercise Set

$(n-2)180°$

1. Find the sum of the interior angles of the polygons for each number of sides.

a) 20 $\underline{3240°}$ b) 17 $\underline{2700°}$

c) 39 $\underline{6660°}$ d) 23 $\underline{3780°}$

e) x $\underline{(x-2)180°}$ f) y $\underline{(y-2)180°}$

2. One interior angle of a regular polygon is given. Find the number of sides. $\frac{(n-2)(180)}{n} = \text{Int Ang}$

a) 90° $\underline{4}$ b) 156° $\underline{15}$

c) 144° $\underline{10}$ d) 179° $\underline{360}$

e) 160° $\underline{15}$ f) 165° $\underline{24}$

$(n-2)180 = 90n \rightarrow 180n - 90n = 360 \rightarrow 90n = 360 \quad n = 4$

3. The number of sides of a regular polygon is given. Calculate the measure of each interior angle. $\frac{(n-2)180}{n}$

a) 4 $\underline{90°}$ b) 8 $\underline{135°}$

c) 13 $\underline{152.3°}$ d) 17 $\underline{158.8°}$

e) x $\underline{\frac{(x-2)180}{x}}$ f) y $\underline{\frac{(y-2)180}{y}}$

4. The sum of the interior angles of a regular polygon is given. Calculate the measure of each exterior angle.

a) 2880° $\underline{20°}$ b) 1620° $\underline{32.7°}$

c) 3780° $\underline{15.7°}$ d) 3420° $\underline{17.1°}$

e) 4860° $\underline{12.4°}$ f) 7740° $\underline{8°}$

Need n 1st then $\frac{360}{n}$

$(n-2)180 = \text{sum}.$

12. Two circles have areas of 16π and 25π. Find the ratio of their circumferences.

$16\pi : 25\pi \rightarrow \pi r^2 : \pi r^2$

$\pi 4^2 : \pi 5^2 \quad r=4$ and $r=5$

circumference

• $2\pi r$ for $r \rightarrow 4:5$

13. Two regular pentagons have perimeters 8 cm and 16 cm. What is the ratio of their areas?

~~Pentagon 5 sides each side~~

Section 1.5

14. A sphere has radius 3 and a hemisphere has radius 6. Compare the ratio of the volume of the sphere to the volume of the hemisphere.

$\frac{4}{3}\pi r^3 : \frac{4}{3}\cdot\frac{1}{2}\pi r^3$

$\frac{\cancel{4}}{\cancel{3}}(3)^3 : \frac{\cancel{4}(6)^3}{\cancel{3}\cdot 2}$

$3^3 : \left(\frac{6}{2}\right)^3 \rightarrow 27 : \frac{216}{2}$

$27 : 108$

$1 : 4$

15. The ratio of the volume of two cubes is 125 to 64. What is the ratio of their surface areas?

$x^3 : x^3$

$125 : 64$

$5 : 4$

$x=5 \quad x=4$

$\cancel{6}x^2 : \cancel{6}x^2$

$x^2 : x^2$

$5^2 : 4^2$

$25 : 16$

16. Two spheres of the same density have a ratio of 4 to 9 in surface area. If the small sphere weighs 10 kg, what does the large sphere weigh?

17. A cylinder has its height doubled and its radius halved. What is the ratio of the volumes of the original cylinder to the modified cylinder?

18. A toy boat has a scale of 1:40 to an actual boat. If the mast on the toy boat weighs 216 grams, how many metric tons does the actual boat's mast weigh? (1000 g = 1 kg, 1000 kg = 1 t)

19. A sphere is inscribed in a right circular cylinder. What is the ratio of the volume of the sphere to the volume of the cylinder?